

WHAT IS CLAIMED IS:

1. A vector-detecting apparatus that detects the in-phase component and the quadrature-phase component of a pre-determined frequency signal, said apparatus comprising:
 - 5 a first filter; and
 - a second filter whose impulse response is orthogonal to said first filter, wherein the output of said first filter is regarded as the in-phase component of said pre-determined frequency signal, and output of said second filter is regarded as the quadrature-phase component of said pre-determined
 - 10 frequency signal.
2. The vector-detecting apparatus according to claim 1, wherein the impulse response of said first filter is weighted by the sine function of the same frequency as the pre-determined frequency signal and the impulse response of said second
- 15 filter is weighted by the cosine function of the same frequency as the pre-determined frequency signal.
3. A vector-detecting apparatus that detects the in-phase component and the quadrature-phase component of a pre-determined frequency signal, said
- 20 apparatus comprising:
 - a frequency converter;
 - a first filter; and
 - a second filter,

wherein said first and second filters filter the output signal of said frequency converter and whose impulse responses are orthogonal to each other, and wherein the output of said first filter is regarded as the in-phase component of said pre-determined frequency signal, and the output of said second filter is
5 regarded as the quadrature-phase component of said pre-determined frequency signal.

4. The vector-detecting apparatus according to claim 3, wherein the impulse response of said first filter is weighted by the sine function of the same frequency
10 as said pre-determined frequency signal after frequency conversion by said frequency converter, and the impulse response of said second filter is weighted by the cosine function of the same frequency of the same pre-determined frequency signal after frequency conversion by the frequency converter.

15 5. The vector-detecting apparatus according to claim 3, wherein the ratio of the frequency of said pre-determined frequency signal before conversion by said frequency converter and the frequency after conversion by said frequency converter is an integer of 2 or higher.

20 6. An impedance measuring apparatus comprising a vector-detecting apparatus, wherein said vector-detecting apparatus comprises:

a first filter and a second filter whose impulse responses are orthogonal to each other;

wherein the output of said first filter is regarded as the in-phase component of said pre-determined frequency signals, and the output of said second filter is regarded as the quadrature-phase component of said pre-determined frequency signal.

5

7. The impedance measuring apparatus according to claim 6, wherein the impulse response of said first filter is weighted by the sine function of the same frequency as the pre-determined frequency signal and the impulse response of said second filter is weighted by the cosine function of the same frequency of the pre-determined frequency signal.

10

8. An impedance measuring apparatus that measures the in-phase component and the quadrature-phase component of a pre-determined frequency signal, said apparatus comprising:

15

a frequency converter;

a first filter; and

a second filter, wherein said first and second filters are capable of filtering the output signal of said frequency converter and whose impulse responses are orthogonal to each other,

20

wherein the output of said first filter is regarded as the in-phase component of said pre-determined frequency signal, and the output of said second filter is regarded as the quadrature-phase component of said pre-determined frequency signal.

9. The impedance measuring apparatus according to claim 8, wherein the impulse response of said first filter is weighted by the sine function of the same frequency as the pre-determined frequency signal after frequency conversion by said frequency converter and the impulse response of said second filter is
5 weighted by the cosine function of the same frequency as the pre-determined frequency signal after frequency conversion by said frequency converter.
10. The impedance measuring apparatus according to claim 8, wherein the
10 ratio of the frequency of said pre-determined frequency signal before conversion by said frequency converter and the frequency after conversion by said frequency converter is an integer of 2 or higher.